REMARKS

This amendment is responsive to the Office Action dated September 4, 2008. Applicant has amended claims 1, 25, 30, 54, and 76–78. Claims 1, 5-25, 28-30, 34-54 and 58-78 are pending.

Response to the Examiner's Arguments

In the Office Action under the heading "Response to Arguments," the Examiner indicated that Applicant's arguments are moot in view of the new grounds of rejection. Applicant notes that the grounds of rejection are not new, as suggested by the Examiner. In the previous Office Action mailed February 21, 2008, the Examiner rejected Applicant's claims 1, 8-19, 21-25, 28-30, 37-48, 50-54, 61-64 and 66-75 under 35 U.S.C. 103(a) as being unpatentable over St. John (US 2002/0136200) in view of Dan et al. (US 6,047,309). In the current Office Action dated Septermber 4, 2008, the Examiner has once again rejected Applicant's claims 1, 8-19, 21-25, 28-30, 37-48, 50-54, 61-64, 66-78 under 35 U.S.C. 103(a) as being unpatentable over St. John (US 2002/0136200) in view of Dan et al. (US 6,047,309). Clearly, the same references were cited in support of both rejections under 35 U.S.C. 103(a), and therefore the grounds of the rejection are not new.

Moreover, the Examiner indicated in the above noted previous Office Action that claims 4-7, 27, 33-36 and 57-60 would be allowable over the St. John and Dan references if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. Applicant elected to amend claims 1, 25, 30 and 54 to include the limitations of respective claim 4, 27, 33 and 57 and submitted new claims 76-78 that recited the subject matter of claims 1, 30 and 54 and claims 7, 36 and 60, which the Examiner indicated would be allowable, again, over both the St. John and Dan references. Yet, without any explanation, the Examiner has rejected these amended claims under 35 U.S.C. 103(a) as being unpatentable over the very same references, i.e., St. John and Dan, that the Examiner indicated these amended claims would overcome.

MPEP Section 706.04, titled "Rejection of Previously Allowed Claims," strongly cautions that Examiners should take "[g]reat care ... in authorizing such a rejection."[1] For this reason, Applicant requests at the very least some form of clarification with regard to why the claims, as previously amended to overcome the St. John and Dan references at the Examiner's indication, now do not overcome these very same references. To merely suggest that Applicant's arguments are moot over the new grounds of rejection is improper, especially considering that the grounds of rejection are not new.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1, 8-19, 21-25, 28-30, 37-48, 50-54, 61-64 and 66-78 under 35 U.S.C. 103(a) as being unpatentable over St. John (US 2002/0136200) in view of Dan et al. (US 6,047,309). Applicant respectfully traverses the rejection to the extent such rejections may be considered applicable to the claims as amended. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

For example, the applied references lack any teaching to suggest a method comprising storing a packet to one of a plurality of hold queues and monitoring a loading condition of a transmit queue by monitoring an amount of data residing within the transmit queue, as required by Applicant's currently amended claim 1.

The applied references further lack any teaching to suggest the method also comprising dynamically determining a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time by comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, and (iii) computing the time epoch based on the system load and a previous time epoch, as recited by Applicant's currently amended claim 1.

The applied references also lack any teaching to suggest the method further comprising transferring, at the dynamically determined time epoch, the packet from the one of the plurality

[1] *Citing Ex parte Grier*, 1923 C.D. 27, 309 O.G. 223 (Comm'r Pat. 1923); *Ex parte Hay*, 1909 C.D. 18, 139 O.G. 197 (Comm'r Pat. 1909).

of hold queues to the transmit queue for delivery to a network device via a downstream channel, as required by Applicant's currently amended claim 1.

Applicant notes initially that the Examiner repeatedly misconstrues the St. John reference to read on Applicant's currently amended claim 1. St. John, as one example, lacks any teaching to suggest monitoring a loading condition of a transmit queue by monitoring the amount of data residing within the transit queue, contrary to the Examiner's assertions otherwise. As a result of this first deficiency, St. John lacks any teaching to suggest dynamically determining a time epoch based on the loading condition. Dan fails to overcome these deficiencies of St. John contrary to the Examiner's assertion otherwise, and as a result, Applicant submits that the combined teachings of St. John in view of Dan fail to teach or suggest each and every limitation recited by Applicant's currently amended claim 1.

The primary reference, St. John, relied upon by the Examiner discusses a system that performs a modified Deficit Round Robin (DRR) algorithm in order to service packet flows.[2] This modified DRR algorithm entails updating quantum values assigned to hold queues (e.g., queues 210, 215, 220 of Figure 2 of St. John) to reflect excess or deficit bandwidth.[3] Paragraph [0041] of St. John clearly lays out the differences between the conventional DRR algorithm and the St. John modified DRR algorithm, but under no reasonable construction can the modified DRR algorithm be read as teaching or suggesting each and every limitation recited by Applicant's currently amended claim 1. In fact, the modified DRR algorithm suffers from many of the deficiencies noted in paragraphs [0010]–[0013] of Applicant's background, which the invention set forth in Applicant's currently amended claim 1 overcomes.

As suggested above, Applicant's claim 1 requires monitoring a loading condition of a transmit queue by monitoring an amount of data residing within the transit queue. The Examiner suggests that paragraph [0039] of St. John teaches this limitation. The Examiner is apparently of the opinion that this paragraph of St. John, by way of disclosing updating a quantum value of a queue, teaches to monitoring a loading condition of a transmit queue. This is clearly an improper construction of St. John. Applicant's required transmit queue may more accurately equate to St. John's output queue, which is shown as output queue 225 of St. John's Figure 2. St. John is

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[2] ¶ [0042].
[3] ¶ [0041].

silent with respect to monitoring this output queue, and therefore lacks any teaching to suggest monitoring a loading condition of a transmit queue, as required by Applicant's currently amended claim 1.

Moreover, setting aside that paragraph [0039] refers to updating a quantum value for a ***holding*** queue not a ***transmit*** or output queue, Applicant fails to understand how updating a quantum value of a queue may translate into monitoring a loading condition of a transmit queue, as required by Applicant's currently amended claim 1. According to St. John, a quantum value "defines the throughput of that particular queue."[4] St. John further explains that a quantum value, in other words, "typically defines the QoS that each particular queue can guarantee."[5] QoS or queue throughput, both of which may be represented by a quantum value according to St. John, is distinctly different from a loading condition, let alone a loading condition monitored by monitoring an amount of data residing within the transmit queue, as required by Applicant's currently amended claim 1.

With respect to how this monitoring is achieved, e.g., by monitoring an amount of data residing within the transmit queue, the Examiner suggests that paragraph [0039] teaches this by disclosing that packets in the queue may be serviced first by placing them in the output queue. Applicant again fails to understand how placing packets in the output queue relates to monitoring the loading condition of the transmit queue, especially in view of the earlier comments described above regarding updating the quantum value. In this respect, Applicant requests further clarification from the Examiner in order to properly assess the basis of this aspect of the rejection. Regardless, Applicant submits that St. John lacks any teaching to suggest monitoring a loading condition of a ***transmit*** queue by monitoring an amount of data residing within the ***transmit*** queue, as required by Applicant's currently amended claim 1.

Applicant further notes that St. John lacks any teaching to suggest dynamically determining a time epoch ***based on the loading condition***, also as required by Applicant's currently amended claim 1. Applicant notes that St. John does teach to updating quantum values at a time interval (which may be construed as a time epoch) equal to what appears to be a

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[4] ¶ [0032].
[5] ¶ [0032].

variable referred to as "update_interval."[6] St. John suggests that it is preferential to keep this interval constant, but if this interval cannot be held constant, St. John states that "update_interval may be set to the current time decreased by the last update interval."[7] Thus, St. John may determine a time epoch, but St. John fails to teach or suggest that this update_interval may be determined ***based on the loading condition***. In fact, St. John, as described above, is silent with respect to monitoring the loading condition, and it follows, therefore, that St. John fails to teach or suggest dynamically determining a time epoch based on the loading condition, as required by Applicant's currently amended claim 1.

Applicant notes that as a result of this second deficiency with respect to dynamically determining a time epoch and the explicit teaching that time epochs occur at a constant interval, St. John provides for a modified DRR algorithm that triggers time epochs at a constant interval or at least a relatively constant interval (keeping in mind that the interval may be increased if not capable of being held constant). In this respect, the St. John modified DRR algorithm may suffer from one or more of the very deficiencies noted in paragraphs [0010]–[0013] of Applicant's specification by failing to monitor the load of the ***transmit*** queue. For example, by failing to monitor the load condition of the transmit queue, the St. John modified DRR algorithm may fail to comply with DOCSIS requirements, especially during period of high congestion, as it may allocate the same amount of time to service a queue with few packets as a queue with a large number of packets. The St. John algorithm may therefore waste precious processing time by completing the service of the queue with few packets before the constant time interval expires. As a result, the St. John modified DRR algorithm may inefficiently service packets by disregarding load.

By dynamically determining the time epoch based on the loading condition, as required by Applicant's currently amended claim 1, however, Applicant's invention may maintain a particular loading condition and ensure that time is not wasted when servicing the hold queues. In other words, by dynamically determining the time epoch based on the loading condition, Applicant's invention may ensure that the hold queues have enough packets to service within the given interval rather than waste valuable processing time on queues that have fewer packets.

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[6] ¶ [0062].
[7] ¶ [0062].

This may not only avoid DOCSIS requirement violations but more efficiently service the hold queues to avoid wasting valuable processing time. Thus, the St. John system suffers from one or more of the very deficiencies noted in paragraphs [0010]–[0013] of Applicant's background, which Applicant's invention as set forth in the claims may overcome due to its load adaptive nature, e.g., dynamically determining a time epoch based on the loading condition.

To summarize, Applicant submits that St. John suffers from at least the above stated two deficiencies. First, St. John lacks any teaching to suggest monitoring a loading condition of a ***transmit*** queue by monitoring an amount of data residing within the ***transmit*** queue, as required by Applicant's currently amended claim 1. Second, as a result of the first deficiency, St. John lacks any teaching to suggest dynamically determining a time epoch based on the loading condition, as further required by Applicant's currently amended claim 1.

As noted above, Dan fails to cure these two deficiencies noted above with respect to St. John, and as a result, Applicant submits that the combined teachings of St. John in view of Dan fail to reach the invention set forth in Applicant's currently amended claim 1. Dan describes a system for delivering Video on Demand (VOD).[8] To facilitate delivery of video requested by VOD customers, the Dan VOD system maintains a server load table that tracks load conditions for various video servers.[9] Dan explains that "load can be, for example, defined as the queue length (number of outstanding requests) at the server or as the server utilization measured as the number of requests served per unit time."[10] At no point, however, does Dan teach, much less suggest, monitoring a loading condition of a ***transmit*** queue by monitoring an amount of data residing in the ***transmit*** queue.

Quite the contrary, Dan, as noted above, suggests that monitoring the load comprises monitoring the load of a what might be referred to as a processing or request queue, which is distinctly different from a transmit queue. In fact, Dan is dealing with an entirely different issue than either St. John or, for that matter, Applicant's invention. The Dan VOD system is trying to improve delivery of VOD content by selecting a server that includes a replicated copy of requested video content based on which of these servers currently are under the least load. The

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[8] Abstract.
[9] Column 3, lines 53–64.
[10] Column 3, lines 53–64.

Dan VOD involves measuring request queues, not transmit queues. St. John, however, is attempting to deliver downstream content ***fairly*** to a plurality of user devices that share a common communication medium. Dan is unconcerned with delivery of downstream traffic to users and instead focuses on selecting an appropriate server within the VOD node.

It is therefore unclear how one of ordinary skill in the art may combine the load balancing aspect of Dan's VOD system with the modified DRR algorithm of St. John. The Examiner merely suggests that one of ordinary skill in the art at the time of the invention may use the timestamps issued by VOD servers (which are used to monitor load of a request queue) as taught by Dan in the systems and computer program products for bandwidth allocation in a multiple access system of St. John in order to enhance system efficiency. Applicant notes, however, that St. John deals with delivery of content to downstream users while Dan is concerned with servicing requests issued by downstream users. Clearly, these are two distinct and separate portions of a standard connection that cannot so simply be combined.

Regardless of the suitability of such a combination, Applicant notes that Dan monitors a loading condition of a ***request*** queue by monitoring a number of requests within the request queue and therefore lacks any teaching to suggest monitoring a loading condition of a ***transmit*** queue by monitoring an amount of data residing within the ***transmit*** queue, as required by Applicant's currently amended claim. In this respect, Dan fails to cure the first deficiency noted above with respect to St. John.

Dan also fails to teach or suggest dynamically determining a time epoch based on the loading condition, as required by Applicant's currently amended claim 1, and therefore fails to overcome the second deficiency noted above with respect to St. John. The Examiner cites column 3, lines 53–65 as disclosing this limitation. As noted above, this portion of Dan refers to monitoring a load by monitoring the number of requests in a request queue. The server load table described by this portion of Dan suggests that delay may be observed with respect to each of the servers and stored to the server load table along with a delay timestamp noting the time at which the delay was observed. This portion of Dan further suggests that server load table may also store the load as reported by the server (e.g., server utilization) and a load timestamp, which represents a server generated timestamp of the time at which the load was reported.

Applicant, however, once again fails to understand how this relates to dynamically determining a time epoch based on the loading condition, much less dynamically determining a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time by comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, and (iii) computing the time epoch based on the system load and a previous time epoch, as required by Applicant's currently amended claim 1.

The Examiner is apparently of the opinion that the load timestamp disclosed by Dan teaches or at least suggests computing a transmission time to deliver the amount of data in the transmit queue. Dan, however, explicitly teaches that "the load timestamp is the server generated time stamp of the time at which the load 250 was reported."[11] Under no reasonable construction can this be equated with computing a transmission time to deliver the amount of data in the transmit queue, as a timestamp is merely a mark of when something occurs and requires no computation, let alone the type of computation required to compute a transmission time to deliver the amount of data in the transmit queue, as required by Applicant's currently amended claim 1.

Applicant, therefore, requests at the very least clarification with regard to the Examiner's construction of Dan. The Examiner proceeds to blankly cite portions of Dan without relating these portions to Applicant's claim language, leaving Applicant to presume the relationship between Dan and Applicant's claims. Applicant has demonstrated above that Dan teaches to monitoring a loading condition of a ***request*** queue used by a server when servicing requests, which is distinctly different from monitoring a loading condition of a transmit queue used by a network device for delivering content downstream. In this respect, Dan fails to teach not only monitoring a loading condition of a transmit queue, but also dynamically determining a time epoch based on the loading condition, both as required by Applicant's currently amended claim 1.

In fact, Dan makes no mention of determining a time epoch at all, as Dan is unconcerned with transferring packets from one of the plurality of hold queues to a transmit queue for delivery

[11] Column 3, lines 53–65.

to a network device via a downstream channel in response to the time epoch. Dan merely services requests as quickly as possible and no one request has priority over another, as is the case for downstream data delivered by the St. John system and, for that matter, Applicant's own invention. As a result, Applicant submits that not only does the combination of St. John and Dan not reach Applicant's invention but the combination of St. John and Dan itself is at best tenuous and more than likely improper. In this manner, the Examiner has misconstrued both St. John and Dan to read on Applicant's currently amended claim 1.

Applicant has amended independent claims 25, 30, 54 and 76–78 in a manner similar to that of currently amended claim 1. As a result, Applicant submits that the applied references fail, for the same reasons stated above, to teach or suggest each and every limitation of these claims.

For example, the applied reference lack any teaching to suggest a computer-readable storage medium that stores instructions for causing a programmable processor to store a packet to one of a plurality of hold queues, monitor a loading condition of a transmit queue by monitoring an amount of data residing within the transmit queue and dynamically determines a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time by comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, and (iii) computing the time epoch based on the system load and a previous time epoch, as required by Applicant's currently amended claim 25. The applied references also fail to teach or suggest the computer-readable medium comprising instructions for causing the programmable processor to transfer, at the dynamically determined time epoch, the packet from the one of the plurality of hold queues to the transmit queue for delivery to a network device via a downstream channel, as further required by Applicant's currently amended claim 25.

As another example, the applied references fail to teach or suggest a device comprising a control unit that stores packets from a variable number of service flows to one of a static number of hold queues, monitors a loading condition of a transmit queue by monitoring an amount of data in a transmit queue, dynamically determines a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time by comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, and (iii) computing the

time epoch based on the system load and a previous time epoch, and transfers, at the dynamically determined time epoch, the packet from the one of the static number of hold queues to the transmit queue for delivery to a network device via a downstream channel, as required by Applicant's currently amended claim 30.

As yet another example, the applied references fail to teach or suggest a system comprising a cable modem and a cable modem termination system that comprises a downstream scheduler that includes a transmit queue, and a load monitor that monitors a loading condition of the transmit queue by monitoring an amount of data residing within the transmit queue and dynamically determines a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time by comparing the transmission time to a constant lower limit and selectively setting the system load based on the comparison, and (iii) computing the time epoch based on the system load and a previous time epoch, as required by Applicant's currently amended claim 54. The applied references further fail to teach or suggest the cable modem termination system that also comprises a queue assignment module that stores a packet to one of a plurality of hold queues, and transfers, at the dynamically determined time epoch, the packet from the one of the plurality of hold queues to the transmit queue for delivery to the cable modem via a downstream channel, as required by Applicant's currently amended claim 54.

As still another example, the applied references lack any teaching to suggest a method comprising storing a packet to one of a plurality of hold queues, monitoring a loading condition of a transmit queue by monitoring an amount of data residing within the transmit queue, dynamically determining a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time based on the transmission time, and (iii) computing the time epoch by adding the system load to a previous time epoch, and transferring, at the dynamically determined time epoch, the packet from the one of the plurality of hold queues to the transmit queue for delivery to a network device via a downstream channel, as required by Applicant's currently amended claim 76.

As another example, the applied references lack any teaching to suggest a device comprising a control unit that stores packets from a variable number of service flows to one of a

static number of hold queues, monitors a loading condition of a transmit queue by monitoring an amount of data in a transmit queue, dynamically determines a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time based on the transmission time, and (iii) computing the time epoch by adding the system load to a previous time epoch, and transfers, at the dynamically determined time epoch, the packet from the one of the static number of hold queues to the transmit queue for delivery to a network device via a downstream channel, as required by Applicant's currently amended claim 77.

As yet another example, the applied references lack any teaching to suggest a system comprising a cable modem and a cable modem termination system that comprises a downstream scheduler that includes a transmit queue, a load monitor that monitors a loading condition of the transmit queue by monitoring an amount of data residing within the transmit queue and dynamically determines a time epoch based on the loading condition by (i) computing a transmission time to deliver the amount of data in the transmit queue, (ii) computing a system load in units of time based on the transmission time, and (iii) computing the time epoch by adding the system load to a previous time epoch, and a queue assignment module that stores a packet to one of a plurality of hold queues, and transfers, at the dynamically determined time epoch, the packet from the one of the plurality of hold queues to the transmit queue for delivery to the cable modem via a downstream channel, as required by Applicant's currently amended claim 78.

Applicant also submits that the above arguments made with respect to independent claims 1, 25, 30 and 54 apply to claims 8-19, 21-24, 28, 29, 37-48, 50-53, 61-64 and 66-75 by virtue of these claims 8-19, 21-24, 28, 29, 37-48, 50-53, 61-64 and 66-75 depending from respective independent claims 1, 25, 30 and 54.

For at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 1, 8-19, 21-25, 28-30, 37-48, 50-54, 61-64 and 66-78 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

In the Office Action, the Examiner rejected also claims 20, 49 and 65 under 35 U.S.C. 103(a) as being unpatentable over St. John and Dan as applied to claims 1, 8, 11, 14, 17, 30, 37, 39, 43, 46, 54, 61 and 63 and further in view of the background of St. John. Applicant notes that

this rejection is no different from the rejection directly above, as both of these rejections rely on the same two references. As a result, Applicant submits that the arguments made above with respect to independent claims 1, 30 and 54 apply to these claims 20, 49 and 65 by virtue of these claims 20, 49 and 65 depending from respect independent claims 1, 30 and 54. In other words, the background of St. John provides no teachings or suggestions to overcome the deficiencies noted above with respect to St. John. The applied references therefore fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

For at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 20, 49 and 65 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date: December 4, 2008

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